

A Causal Model of Warfare

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Regardless of whether its mechanism is attrition or maneuver warfare, military victory often depends on intangibles such as morale and the will to fight. Zimm crafts a model to explain how maneuver warfare targets those intangibles and triggers psychological results that are more decisive than the physical ones.

CURRENT US MARINE Corps doctrine dating from the 1989 issue of Fleet Marine Force Manual 1, *Warfighting*, espouses “maneuver warfare.”¹ Maneuver shatters “the cohesion of the enemy system,” achieving victory by paralyzing an “enemy who has lost the ability to resist.”² This concept identifies maneuver as a weapon.

The US Army concept of maneuver is less ambitious. Maneuver is “movement relative to the enemy to put him at a disadvantage,” wherein “friendly forces gain the ability to destroy the enemy or hinder his movement through the direct or indirect application of lethal power or threat thereof.”³ Victory is achieved through applying overwhelming combat power.

These two contrasting concepts have been labeled as “maneuver” versus “attrition” or “firepower” schools; the merits of each have been extensively debated.⁴ Supporters cite historical examples in which their system of warfare resulted in victory. However, “similarity of outcome does not imply a similarity of process.”⁵ Military theorists struggle with a “chicken and egg” conundrum: destruction can cause panic and paralysis, and panic and paralysis facilitate destruction. Which is the primary path to victory?

On Victory

History suggests that there are indeed two mechanisms—physical and moral—of victory: destroying or incapacitating the opponent physically and destroying his will.

In the physical mechanism of victory, the defeated side is annihilated. Cannae, Thermopylae, the Fetterman massacre, Little Big Horn, Iwo Jima and Isandhlwana are examples. But in the vast reach of history, examples of annihilation are mercifully few. Such battles are the stuff of epics, and like epics, they are rare.

Soldiers rarely fight to the last man. Characteristically, they surrender, retreat or run in panic well before extermination. At Waterloo, the French Army collapsed after the Imperial Guard failed to break the British line. Destruction had been widespread; the French had already suffered about 15,000 casualties. But defeat came when the remaining 60,000 no longer had the will to stand.

Some have noted that destruction and death are primary mechanisms to undermine morale and have concluded that firepower is sufficient for victory. But physical destruction is not the only way to influence morale. While there are examples of

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resolving battles by annihilating the enemy physically, there are more examples of battles being resolved purely by destroying the enemy's morale and will to fight.

During English King Henry V's campaign in France, "[w]hen the fall of Rouen became known, the rest of Normandy quickly submitted. Often it was sufficient for Henry's captains to appear in front of a town or a castle for it to surrender."⁶ During the War of Spanish Succession, many fortresses and fortified towns surrendered without a fight after the Duke of Marlborough's spectacular victory at Ramillies.⁷ At sea it was common for warships to surrender to a more powerful opponent without exchanging a shot; confrontations were resolved with only the threat of destruction.

Perhaps the most curious example of the purely moral mechanism of victory is the case of capitulating a full field army. At the onset of the War of 1812, "Brigadier General William Hull . . . withdrew to the village of Detroit on 11 August. Five days later, Major General Isaac Brock, the British commander in Upper Canada, moved on Detroit with a much smaller force of regulars, militia and Indians. In a colossal bluff, he urged Hull to surrender, explaining that, once fighting commenced, he would be unable to control his Indians and a massacre might result. His nerve gone, Hull surrendered his entire army without a fight."⁸

This phenomenon is not restricted to the remote past. During the Gulf War, the Iraqis soon learned to associate spotter unmanned aerial vehicles (UAVs) with the devastating fire from battleships' 16-inch guns. In at least one instance Iraqi troops streamed out of their emplacements, waving white flags and raising their hands into the air, surrendering to the UAV before shots were fired.

Clausewitz and the Moral Element of War

Carl von Clausewitz is often cited—unfairly—as espousing the attritionist school. In fact, Clausewitz had important observations on what he

called *moral* and *moralische Kraft*, terms variously translated as "morale" and "moral force."

According to author Bernard Brodie, "Clausewitz's work stands out among those very few older books that have presented profound and original insights that have not been adequately absorbed in later literature."⁹ It is instructive to consult Clausewitz's largely ignored ideas on the place of war's moral factors: "[T]he moral elements are among the most important in war. They constitute the spirit that permeates war as a whole, and at an early stage they establish a close affinity with the will that moves and leads the whole mass of force, practically merging with it, since the will is itself a moral quantity. . . . The spirit and other moral qualities of an army, a general or a government, the temper of the population of the theater of war, the moral effects of victory or defeat—all these vary greatly. They can moreover influence our objective and situation in very different ways. Consequently, though next to nothing can be said about these things in books, they can no more be omitted from the theory of the art of war than can any of the other components of war. To repeat, it is paltry philosophy if in the old-fashioned way one lays down rules and principles in total disregard of moral values."¹⁰ Clausewitz further simplifies things: "One might say that the physical [factors] seem little more than the wooden hilt, while the moral factors are the precious metal, the real weapon, the finely honed blade."¹¹

If Clausewitz considered moral forces to be so important, why did he not give additional attention to them? In *On War* he states that "[w]e might list the most important moral phenomena in war and, like a diligent professor, try to evaluate them one by one. This method, however, all too easily leads to platitudes, while the genuine spirit of inquiry soon evaporates, and unwittingly we find ourselves proclaiming what everybody already knows."¹²

The use of computers has caused us to lose touch with warfare's human element. What once was "what everybody already knows" is now lost behind the mathematical sterility of lethal areas, probabilities of kill and force loss-exchange ratios. We must take the part of the diligent professor and recapture the moral phenomenon in war.

Clausewitz, a creature of the industrial and scientific revolutions, drew his tools and metaphors from physics and mechanics, as witnessed by his concepts of friction and geometrical factors. In his time the complexities of human behavior were still beyond comprehension, which prompted him to conclude that the moral elements "cannot be classified or counted. They have to be seen or felt."¹³

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Re-examining combat theory. Ideally, a useful theory of combat follows a set of interrelated theoretical propositions (if . . . then statements) and describes a causal relationship (directional influence) between combat actions (antecedent variables) and battle outcomes (consequent variables). Theory must address the “chicken or the egg” problem. A causal model of warfare establishes cause-and-effect relationships between combat actions and battle outcomes.

Developing a causal model of warfare. Figure 1 illustrates the form of a warfare-causality model. Beginning at the upper left, combat begins with an attack on an attribute. An attribute is some characteristic of the opponent—his physical, mental, moral or organizational state. That change causes an output—an intermediate result state. In some cases, a trigger is required before the intermediate result is generated. The summation of immediate outputs leads to the ultimate result.

This type of model is typical of everyday thought. For example, a car driver’s foot attacks the accelerator by pushing it down. This change causes the amount of gas going to the engine to increase, for an output of more engine power. This leads to the result—the car goes faster. Models need not be mysterious; they just establish a causal relationship

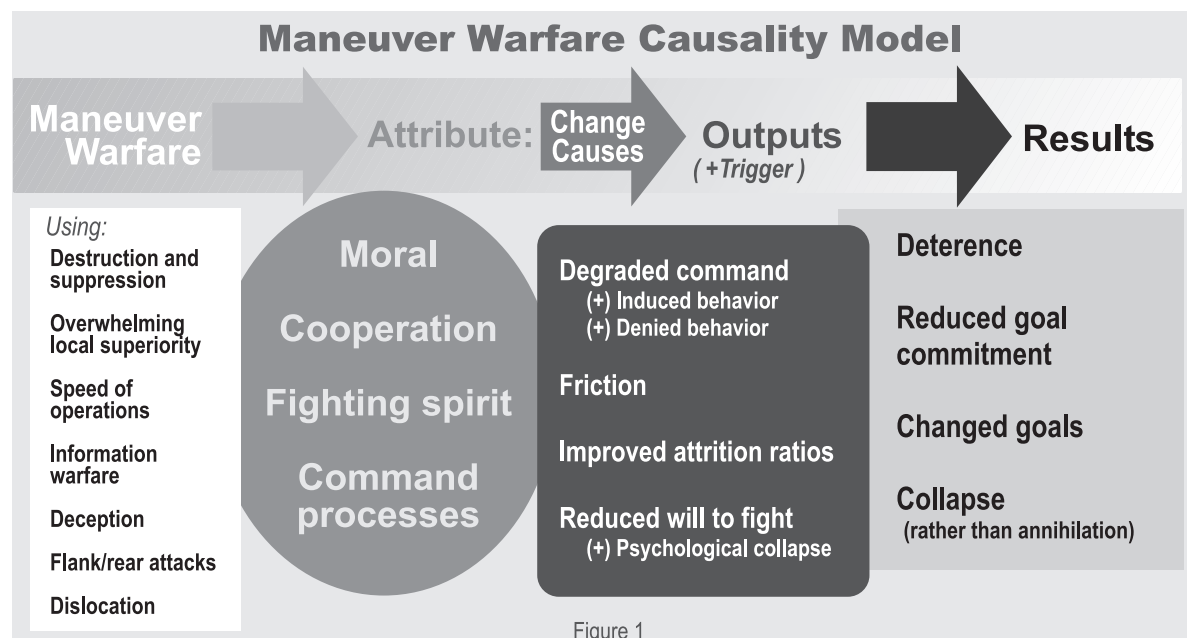
Annihilation can be an artifact of victory. . . . Because Plains Indians killed wounded opponents and troopers feared being captured and tortured, both sides contributed to the lack of prisoners from Custer’s battalion. Similar conditions at Isandhlwana (British versus Zulu) and Kabul (British versus Afghans) resulted in annihilation.

between action and result, sometimes through intermediate steps.

The attributes column lists the opponent’s characteristics that are targeted by attacks. These characteristics are all elements on the moral/psychological plane of warfare. They are singled out as targets because the human element dominates warfare. History emphasizes that victory is achieved primarily against an opponent’s will to continue the fight—a moral rather than physical mechanism.

Thus, attacks are actions or states directed toward changing an opponent’s morale and unit cohesion, cooperation, fighting spirit or command processes. An attack is a means of achieving an effect on the enemy. The physical destruction that results is likewise a means, not an end in itself. An attack can use a variety of means to change an attribute: physical blows to achieve destruction and suppression or psychological tools to achieve moral effect. An attack can also be an activity or state.

Morale, cooperation and fighting spirit are inadequate labels to describe the constituents of *moral*



A destroyed T-72 in northern Kuwait, February 1991. (Opposite) Iraqi prisoners of war being ferried to the rear aboard a CH-47 Chinook.

Desert Storm was notable for the overwhelming Coalition superiority in military power . . .



US Army

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and *moralische Kraft*. The term "morale" also includes the idea of unit cohesion—soldiers' ability to become a team. The term "cooperation" also encompasses interunit cohesion—units that work together.

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Attacks are not restricted to physical blows. Many things affect the enemy's morale, cooperation, fighting spirit and command processes—and thus have the nature of an attack. They can be actions, situations (states) or behaviors. Propaganda broadcasts are psychological actions that can attack the enemy's morale. Overwhelming superiority in a combat zone can influence the enemy's morale and

thus is a state that looks like an attack. Aggressively patrolling borders, enforcing no-fly zones or exercising freedom of the seas close to an opponent's shores are behaviors that influence an opponent.

Note that most of the attacks in Figure 1 do not involve destruction. This model establishes a causal chain among these nondestructive actions that affect the opponent's command processes that, in turn, cause enemy reactions that result in deterrence. For example, highly capable forward-deployed forces available for immediate intervention can deter aggression. The causal model of warfare establishes that connection on the moral level of international conflict.

Destruction Dominates in Some Situations

The causal model of warfare implies that the moral level of warfare is the most decisive. Yet, there are examples of completely destroying one side in which other factors work. This is not uncommon, even in science. Scientists know that Isaac Newton's rules of physics work with inelastic collisions, but in situations with elastic collisions, the rules are slightly different. Those applying the causal model of warfare must consider where the rules are slightly different.

Cases in which cultural factors dominate. Annihilation can be an artifact of victory. For instance, it appears that a primary reason for General George Armstrong Custer's defeat at Little Big Horn was disintegration and a loss of tactical stability symptomatic of failing morale and cohesion.¹⁴ The Indian warrior Red Horse recalled that "some soldiers tried to surrender and were promptly killed."¹⁵ Because



... and particularly as it affected the Iraqis' will to fight.

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In the Fetterman massacre near Fort Phil Kearny, Wyoming, 65 soldiers were found in a space 35 feet in diameter, within which "there were no indications of a severe struggle . . . no empty cartridge shells were about."¹⁶ This indicated that the soldiers had surrendered and were butchered. In World War II Pacific campaigns, Japanese soldiers often refused to surrender even when their morale and fighting spirit were broken. Soldiers huddled in caves and would not come out, forcing US Marines to seal the caves with explosives. When the moral mechanism to victory decides a battle, it can open the door to annihilating the defeated force.

Cases in which weapon lethality is high compared with target numbers or vulnerability. Either a high-lethality or an especially vulnerable target can yield a high "lethality-versus-vulnerability" ratio. A firefight could be won with one shot. The numbers engaged in the battle are low, the vulnerability of each gunfighter is high relative to the weapon's lethality, and the time frame is short. Complete annihilation can occur before morale becomes a factor.

At the other end of the spectrum are nuclear weapons with extremely high lethality, even against large numbers of targets. The short duration of an attack and relative weapon lethality compared with

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the enemy's numbers and vulnerability again allow complete annihilation to resolve the engagement. In situations of high physical vulnerability or high physical lethality, coupled with short duration, the physical mechanism becomes primary.

Cases of low moral vulnerability. There are situations in which one side simply refuses to surrender. Spartan King Leonidas refused to surrender to the Persians at Thermopylae, and the Spartans were annihilated. The Alamo's Texan defenders and the French Foreign Legion at Camerone exhibited similar resolve. The only survivors were either wounded or unable to further resist.

What would result from a confrontation between two forces with low moral vulnerability? Suppose two highly trained maneuver warfare forces employed asymmetric, nonlinear, high-tempo operations that, by their nature, include the ability to

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resist enemy asymmetric, nonlinear, high-tempo operations. The two forces then maneuver to intimidate each other—neither being vulnerable. Firepower and attrition would have to resolve such a conflict. In situations of low moral vulnerability, the physical mechanism becomes primary.

Counterterrorist operations generally fall into this category. Terrorists often use their own deaths to inflict losses on their enemies; often operate alone or in small groups; are impervious to or unaware of setbacks to other groups or their causes (indeed, setbacks sometimes fuel their fanaticism); and are generally impervious to moral persuasion. The moral mechanism to victory—convincing terrorists to give up—may not exist. Physically destroying or incapacitating terrorists is often the only option.

Modeling Morale, Cooperation and Fighting Spirit

Human behavior is inherently complex, chaotic, stochastic and nonlinear. Factors such as significant events develop, modify and change behavior char-

acteristics. What little research is available suffers from confusion in basic assumptions, terminology and paradigms. This is certainly a fruitful field for additional research.

Figure 2 lists factors that strain a unit's morale. The factors are divided into three levels of importance: primary, secondary and tertiary. Factors that contribute to improving morale are indicated with a + and those destructive to morale are indicated by a -. Some factors can be both. For example, "disproportionate odds" can be either positive or negative, depending on which side the odds favor. Many factors strongly depend on time; some factors have nonlinear relationships. Degraded morale impairs cooperation, fighting spirit and command processes and can cause:

- Reduced unit effectiveness.
- Friction.
- Induced behavior such as forcing the enemy to retreat from a defensive position.
- Denied behavior. The force cannot complete tasks, for example.
- Goal displacement; that is, individual goals such as survival become more important than unit objectives.
- Catastrophic collapse; for example, soldiers desert or refuse to use weapons, units lose tactical stability, and unit organizations fail.

Cooperation, fighting spirit and command processes have similar cause-and-effect relationships.

Combat Shock

Probably the single most significant element of human factors a commander can use to affect an enemy's performance is combat shock, which

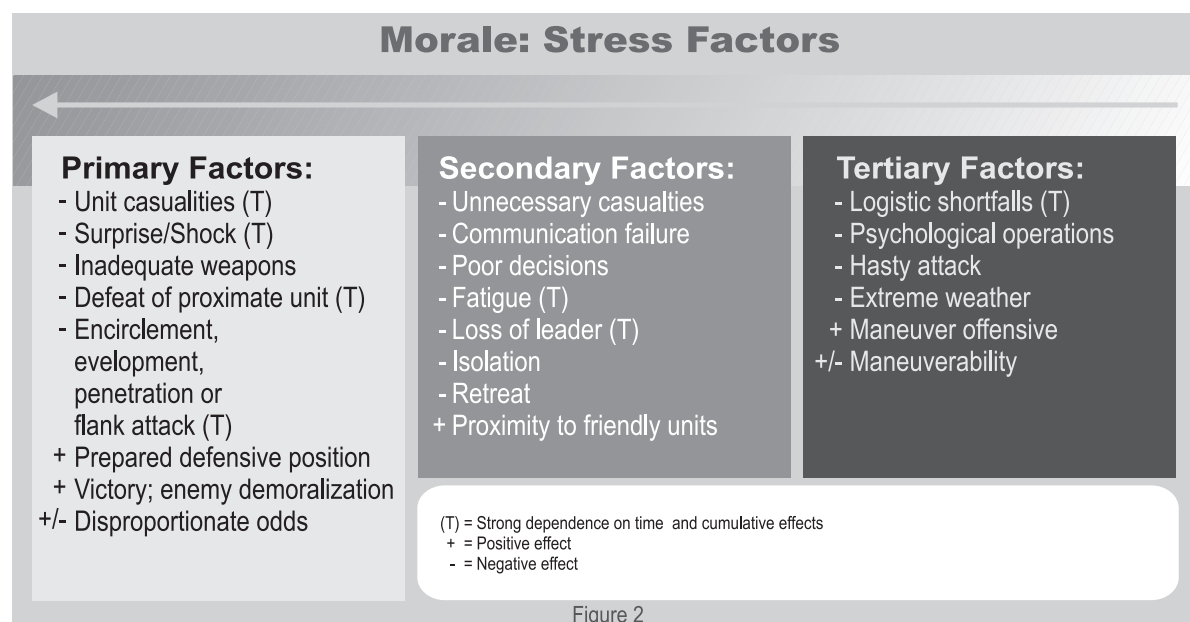


Figure 2

comes from a massive or distinct change in the environment coupled with a severe threat to life. Combat shock effects have been observed as units endure massive indirect fire (bombardment) or direct fire from automatic weapons. Distinctive sounds coupled with a threat to life, such as the screeching noisemakers on World War II Stuka dive-bombers, can produce shock, as can variations from expectations such as doctrinal failures or operational surprise. Close-range engagements with the enemy, casualties and gruesome losses are other shock-producers.

Combat shock generally results in temporarily losing combat effectiveness because of panic or incapacitation. Two of the most prevalent behavioral manifestations are immobility or crowding together when under fire. Command processes can also freeze. For example, after the massive Operation *Cobra* air bombardment that presaged General George S. Patton's breakout from Normandy, experienced German officers were observed wandering through their units in a daze, incapable of exercising command.

Another example is the observed response of units to casualties. A unit can generally continue to operate if it loses 1-percent casualties each day over 10 days; however, apply 10-percent casualties in a few minutes, and the unit can be combat-ineffective for a day or more. Add surprise, despair, hopelessness, fear, fatigue and other factors, and the unit could be combat-ineffective for longer. While such a unit is reorganizing and recovering from the sudden shock of casualties, victory was achieved over 10 percent of the unit by the physical mechanism to victory, while 90 percent succumbed—albeit only temporarily—to the moral mechanism. Taking advantage of

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that fleeting opportunity is a large part of successful generalship.

The causal model of warfare does not espouse a bloodless form of combat. Instead, blood and destruction are placed in their appropriate perspectives as a means to an end, not an end in itself. The model applies new sciences to an old problem; its postulates are not new. Military strategists Sun Tzu, Ardant du Picq, General George C. Marshall and Clausewitz would all approve of the model because it draws on themes they all explicitly espoused or inherently assumed. Its strength is in its connections that more explicitly model victory.

Even if the model's basic framework is solid, details are yet to come. How much combat stress causes debilitation, and what does it take to fully recover? We do not fully understand human variability under combat conditions. Most significantly, few observations have been quantified. The model clarifies the issues, and with clarity comes the ability to examine, criticize, test and argue. As thoughtful people analyze victory using the causal model's framework, tactical, operational and strategic improvements will be inevitable. **MR**

NOTES

1. US Marine Corps Fleet Marine Force Manual 1, *Warfighting* (Washington, D.C.: US Government Printing Office [GPO], 20 June 1997), 74.
2. *Ibid.*
3. US Army Field Manual 100-5, *Operations* (Washington, D.C.: GPO, 14 June 1993), 2-13, 2-9.
4. Richard D. Hooker Jr., *Maneuver Warfare: An Anthology* (Novato, CA: Presidio Press, 1993). While mainly espousing maneuver warfare, this book includes chapters containing counter arguments.
5. Edward De Bono, *Water Logic* (New York: Penguin Putnam Books, 1993), 22.
6. Desmond Seward, *Henry V: The Scourge of God* (Novato, CA: Viking Penguin, 1988), 121.
7. J.R. Jones, *Marlborough* (New York: Cambridge University Press, 1987), 96-97.
8. D. Greaves, *The Battle of Lundy's Lane: On the Niagara in 1814* (Baltimore, MD: The Nautical & Aviation Publishing Company of America, 1993), 9.
9. Bernard Brodie, quoted in H.G. Summers, *On Strategy: A Critical Analysis*

of the Vietnam War (Novato, CA: Presidio Press, 1982), 6.

10. Clausewitz is referring to "system-builders" such as Henri de Jomini who were attempting to reduce military science to a set of rules or axioms. However, this caution could be equally appropriate to modern equation-builders who attempt to calculate the outcomes of battles and the resulting attrition without reference to the moral and psychological factors of war. See also Peter Paret, "The Genesis of *On War*" in Carl von Clausewitz, *On War* (Princeton, NJ: Princeton University Press, 1976), 12.

11. *Ibid.*, 184-5.

12. *Ibid.*, 185.

13. *Ibid.*, 85.

14. R. Fox Jr., *Archaeology, History and Custer's Last Battle* (Norman, OK: University of Oklahoma Press, 1993), 15.

15. Bryan Perrett, *Last Stand! Famous Battles Against the Odds* (New York: Sterling Publishing, Arms and Armour Press, 1991), 61.

16. "Investigating Committee Report," quoted in Fox, 48.

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